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the Gulf of Bothnia. Even when the uncompleted section of the railroad has been finished the Kola route will hardly, in summer at least, replace the Archangel route, because of the shorter railway haul on the latter. However, Soroka and the important coast town of Kem, 35 miles north, can serve as additional ports of entry to relieve any congestion on the Archangel route. With this in view, dredging and construction work have been under way during the past months at these two ports.

Such are the means by which Russia has broken through the bonds imposed on her by the war and gained an unobstructed access to the western sea. To the east her communication with the Pacific, by means of the Trans-Siberian railroad, has not been hindered, but obviously a single line, many thousands of miles in length, cannot properly serve her needs. Russia has thus been forced to create new lines of communication with the western world. While these are in part circuitous and one, the Kola route, only inadequately satisfies Russia's age-long desire to reach an ice-free coast, they will contribute permanently to the economic welfare of the Empire.

THE WASHINGTON MEETING OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS

The twelfth annual meeting of the Association of American Geographers was held at Washington, D. C., December 30-31, 1915, and January 1, 1916. Forty-one members were present and more than that number of invited guests.

Of the forty papers announced, the following twenty-five were read. In most cases, brief characterizations of the papers are given, based on abstracts supplied by the authors.

GENERAL

WILLIAM BOWIE (introduced)—*The Place of Geodesy in Scientific Geography.*

Geodesy is essential in the determination of the shape and size of the earth. From the data secured from geodetic observations we are enabled to determine approximate deviations from the normal in the densities in the outer portions of the earth. By means of triangulation and geodetic leveling the fundamental control in position and elevation is obtained for surveys and maps.

DORA KEEN (introduced)—*Avalanches as a Factor in the Alimentation of Glaciers.*

WILLIAM G. REED—*The Probability of Specified Meteorological Conditions.*

A knowledge of the ''business risk'' from unfavorable weather conditions is essential for successful farming. The ''probability curve'' may be used to determine this risk. As an illustration of what may be done a map of the dates after which killing frost will occur only one year in ten on the average was shown. Similar maps have been made for autumn frosts and for the probable season without killing frost four years in five.

ELLSWORTH HUNTINGTON—*Geographic Variables.*

Every geographer recognizes that the effect of geographic environment varies. This variation has two aspects. In the first place man's own capacities vary greatly from region to region and in different stages of development. Therefore a region such as the grassy prairies, which at one stage presents an insuperable obstacle to agriculture, may in a later stage become the region where agriculture is most profitable. The second type of variation is due to the fact that certain phases of geographic environment, especially the climatic conditions, change markedly from year to year and cycle to cycle. The work of Clayton on rainfall and panics, of Brückner on rainfall and migrations, of the British officials in India on famines, birth-rates, crime, and social conditions, of Moore on crops and economic cycles in the United States, and of Dexter on weather and conduct, are samples of an immense body of facts which belong to the realm of geographic variables. One of the next great steps in the science of geography is, perhaps, to correlate these facts, and to show how geographic variables, such as rainfall or other conditions of climate, give rise to a long series of constantly changing results, beginning with crops and annual migrations and going on to the prosperity of the farmers, fishermen, and others, the activity of merchants, the productivity of factories, the scale of general prices, the occurrence of financial panics, the amount of poverty and crime, and the play of all these conditions upon the world's political and social fabric. Such a treatment leads into the fields of biology on one side and of economics and history on the other, but geography can never occupy its rightful place without it.

R. H. WHITBECK—*Geographic Environment as a Factor in Evolution and in Race Differentiation.*

The influence of geographic environment is one of the basic questions of scientific geography. At the bottom, it is a biological question,—Can environment so act upon organisms as to progressively modify them and eventually produce wide variations from the parent stock? If so, how is it accomplished? Are differences in environment, and are changes in environmental conditions competent to bring about the present differentiations among groups of plants, animals, and men?

JOHN L. RICH (introduced)—*Correlation of Cultural Features with Stage in the Erosion Cycle.*

Since cultural features—as roads, houses, clearings, villages, and cities—are the outward expression of the life of the people, their control by natural conditions such as relief, slope, or climate may be taken as a partial measure of the influences which the latter exert upon the activities of the people of the region under investigation. Quantitative measurements of the distribution of three cultural features—roads, houses, and towns—were made for typical examples of topography in each stage of the erosion cycle and their results expressed in percentages and correlated by means of graphs. In infancy and youth *upland culture* predominates; clearings, roads, houses, and towns are on the uplands while the valleys are avoided. With advance toward early maturity, culture descends more and more into the valleys until, in early maturity, *valley culture* prevails. With advance toward late maturity and old age *slope culture* begins to dominate and increases progressively until, in the final stage, peneplanation, *universal culture* is inaugurated.

CHARLES R. DRYER—*Studies in Economic Geography. I. Definitions and Classifications. II. The Economic Regions of the United States.*

I. A workable organization of economic geography was proposed, consisting of basic definitions and classifications of environments, economies, and economic societies.

II. On the basis provided in (I), the United States was divided into five natural economic regions, the leading environmental and economic factors of each region were discussed, and the rank among economic societies which appears to belong to each was assigned.

HIRAM BINGHAM—*Methods Followed in the Field Work of the Peruvian Expedition of Yale University and the National Geographic Society.*

In organizing the Peruvian expeditions it has been the aim to include representatives of as many different sciences as possible. The field method has been to send a reconnaissance party to construct route maps, take many photographs, establish friendly relations with local officials, landowners, and natives, and learn all possible regarding climatic conditions and the sources of food supply for the animals. This determines the character of future work. A topographic party is next sent into the field to make a map which shall show roads, rivers, bridges, important peaks, and other salient features, as desired by the parties that are to follow. Finally, armed with blue-prints of the maps, with photographs and reports of previous parties, the trained specialist, be he geologist, zoologist, or archeologist, can go immediately to work, and gain the best results.

ALBERT PERRY BRIGHAM—*A Type of Geographical Description.*

Various kinds of descriptions were noticed, as more or less geographical, such as those of the encyclopedia, the census, the guide book, the elementary text book, the special treatise, accounts of exploration and survey, and the records and impressions of travel. Our modern geography should produce a type differing from all of these, mature in subject-matter, complete in its use of principles, finished in literary form, drawing from all sources, and suited not only to teachers and all other educated persons, but to the professional geographer who needs to know the unit considered, not in detail but in substance and total.

ROBERT M. BROWN—*The Need of Considering Minimum Essentials in Geography.*

The paper presented the following points: brief outline of three or four proposals; statement of the demands of educational experts; call on the specialist to insist on a content of broad scope and to give thought to the possibilities of testing knowledge and ability in geography.

REGIONAL

ROBERT DEC. WARD—*The Prevailing Winds of the United States.*

The wind directions as usually shown, by means of arrows (an arrow for each Weather Bureau station), on our daily weather maps and on our annual and monthly charts of wind directions do not give us the view which we need for purposes of broad climatic description. The ordinary wind charts emphasize too much the local peculiarities of each station. What we most want to know is the sweep of our winds: our wind systems, so far as we may indicate them, over the different sections of the country. The prevailing winds for January and for July were thus broadly generalized, on two charts.

OLIVER E. BAKER—*A Map Showing the Agricultural, Forest, and Grazing Areas of the United States.*

C. F. MARBUT—*The Dark-Colored Soils of the United States and Their Agriculture.*

The work of Russian investigators on the dark-colored soils of Russia and Siberia has attracted a great deal of attention during the last few years. The character of these soils and the geographic conditions under which they have been developed were described briefly, and the dark-colored soils of the United States were compared with them in character, distribution, and origin. The agriculture on the dark-colored soils of the United States was briefly discussed by means of a comparison of a soil distribution map and agricultural maps.

ALBERT PERRY BRIGHAM—*The Population of New York State.*

The following topics were discussed: growth as compared with that of typical states in the South, the North-Central region and the West; center of population and its movement; population in relation to altitude, physiographic provinces, and drainage basins; urban and rural population; rural population as related to quality of soil and proximity of cities; belt of dense population as dependent on soil, climate, and facilities for transportation; capacity for population.

F. V. EMERSON—*Geographic Factors and Cane Sugar.*

The cultivation of sugar cane, a tropical plant, in the warm temperate climate of Louisiana and Texas presents some difficulties, and these conditions are reflected in the economic, sociological, and political life of the people.

Sugar cane ordinarily makes a good growth in Louisiana, but harvesting time is somewhat critical. A hard freeze before cutting will usually spoil the entire crop; the sugar content is altered by conditions of sunshine, temperature, relative humidity, and rainfall. Such climatic limitations render the industry somewhat precarious as compared with the great staples, cotton, corn, and wheat. The industry requires expensive, intensive cultivation during the growing season, rather quick gathering during the harvesting period, and fairly prompt sugar extraction during the "grinding season."

Several authropogeographic responses result from these conditions. The relative uncertainty of the crop together with the extremely profitable yields in favorable years attract venturesome *entrepreneurs* either possessed of, or, more frequently, able to borrow, considerable capital. Expensive cultivation and handling strongly tend to large-scale management and to large plantations instead of moderate-sized farms. This tendency is enhanced by the fact that it is a decided advantage to the planter in securing prompt treatment of his product to own or control his own manufacturing plant, and the tendency is therefore toward the control of plantations by capitalists or corporations. Hence it is that the large, somewhat self-sufficing plantation is rather characteristic of the sugar district.

HENRY J. COX—*Influence of the Great Lakes upon the Movement of High and Low Pressure Areas.*

The Great Lakes influence to a certain extent the movement of high and low pressure areas which cross the North-Central states. Because of the higher temperature of the lake water in the colder months of the year as compared with the air temperature in the surrounding area there is a tendency for ''highs'' to avoid and ''lows'' to seek the lake route, and in the warmer months the converse is true. In the colder months there is a tendency for the pressure to decrease in ''highs'' and ''lows'' crossing the lakes, while in the warmer months the pressure tends to increase. ''Highs'' often develop over the lake region in the springtime and remain for a considerable period, thus insuring protracted fair weather.

HOWARD E. SIMPSON (introduced)—*The Islands of Devils Lake, North Dakota, and Their Significance.*

A sketch of the origin and life history of the ice-built boulder piles in a rapidly disappearing glacial lake, with the additional evidence which they offer of the pulsatory climatic changes which have taken place in the Northwest since the close of the Glacial Period.

H. L. SHANTZ (introduced)—*Correlation of Natural Vegetation, Soil Type, and Early Settlement in Eastern Colorado.*

The principal plant associations of eastern Colorado, the relation of these associations to soil type, and the relation of vegetation type and soil type to grazing and crop production. The distribution of the plant associations was shown by sketch maps.

W. M. DAVIS—*The Mission Range, Montana.*

In recognition of the greater value in geographic description of the present than of a past tense, an account was given of what the Mission Range *is* rather than, as on the occasion of the Princeton meeting two years ago, of the processes of uplift, dissection, and glaciation, by which it *has been* formed.

F. E. MATTHES—*The Post-Pleistocene Moraines of the Sierra Nevada.*

Short but conspicuous moraine loops occur in front of all the small glaciers of the Sierra Nevada, as well as in a large number of empty cirques along the crest of the range. Their remarkably fresh appearance, in contrast with which even the younger members of the extensive Pleistocene moraine series seem subdued and ancient-looking, suggests strongly their deposition during post-Pleistocene and, in part at least, historic times. Those last formed are comparable to the recent moraines of Switzerland and Savoy, which, through documentary evidence, have been identified as witnesses of moderate glacier pulsations that occurred during the eighteenth and nineteenth centuries.

The desirability at once suggests itself of a correlation of this record of post-Pleistocene climatic fluctuations with that contained in the rings of the sequoias of the Sierra Nevada, on the one hand, and with that contained in the strand levels about Mono Lake and Owens Lake, on the other.

The conclusions are important in the study of glacial cirques, inasmuch as cirques containing such moraines must be considered as having been recently ''renovated.'' They are not directly comparable to cirques that have been empty since the close of the last glacial epoch.

C. F. MARBUT—*The Relation of Soils to Crops in Southern California.*

A soil map and a crop map, both worked out in detail, presented not only the geography of the various crops but also the relations of the various crops to the soils of the San Bernardino Valley.

ALFRED H. BROOKS—*The Physiographic Provinces of Alaska.*

Five principal physiographic provinces are recognized in Alaska, each one of which is divisible into a number of sub-provinces. These, named from south to north, are: the Pacific Mountain System, the Central Plateau Region, the Rocky Mountain System, the Arctic Mountain System, and the Arctic Slope Region. In this classification a new term, the Arctic Mountain System, is introduced to include the mountain chain which traverses northern Alaska and parallels the Arctic Ocean. It was previously believed that it was an extension of the Canadian Rockies, but this interpretation has proved to be in error both from a tectonic and physiographic standpoint.

ALFRED H. BROOKS—*The Geography of Alaska in Its Relation to Man.*

Geography has controlled the distribution and cultural development of the Alaska natives and, to a large extent, the approach to and occupation of the territory by the white man. This control has been exercised principally through geographic position, by character of relief, drainage, and shore line, by climate, and by distribution of animals and vegetation. The habits and distribution of the native population are the direct result of physical environment, due, in turn, to the interaction between various geographic factors. The distribution of animals and vegetation and the physical barriers to migration have been the controlling geographic influences on the natives of Alaska.

All of the geographic factors listed above have influenced to a greater or less extent the advance of the white man in Alaska. The first settlements in what is now Alaska were determined by the needs of the fur trade. Later, settlements were located to meet the needs of the fisheries, while in recent years a new factor has dominated, for the distribution of mineral resources has largely determined the centers of population.

PHILIP S. SMITH—*Notes on the Exploration of the Lake Clark-Iditarod Region, Alaska.*

The region extends from the western flanks of the Pacific Mountains well in to the Central Plateau province of Alaska. A narrative account of the expedition and a general summary of the topographic features, climate, vegetation, settlements, and population were given.

J. RUSSELL SMITH—*The Island and the Continent at War.*

The conflict between England and Germany was traced in part to contrasting geographical conditions. The continental location of Germany, exposing her to invasion on nearly every side, naturally developed fear of her neighbors and this, in turn, bred a respect in her people for any kind of authority that could protect them. Hence their obedience to military organization and individual subordination.

England, on the other hand, has been free from any danger without, because of her insularity and her fleet. This has led to greater political and individual freedom, but also to a greater laxity of organization, as evidenced by internal political dissensions and the relative neglect of education and science.

The address of the President, Professor Richard E. Dodge, on "Some Problems in Geographic Education, with Special Reference to the Secondary School" was given at the opening of the afternoon session on December 30. On the evening of the same day there was a symposium on methods of geographic exploration. The following evening, at the informal conference on the work of the committee on the physiographic boundaries of the United States, Professor N. M. Fenneman, chairman, reported that an agreement as to a working basis—the most important problem before the committee—had been reached and that one province had been outlined. The members of this committee are: N. M. Fenneman, Eliot Blackwelder, Marius R. Campbell, D. W. Johnson, and F. E. Matthes.

An exhibit had been arranged by the local members showing some recent work of the government bureaus whose activities are of a geographic nature. The U. S. Geological Survey displayed a series of maps to illustrate its recent experiments in the representation of generalized relief by shading rather than by contours. These included the standard base map of the United States, 1:2,500,000, and the recently published outline map of Alaska, 1:1,500,000, for parts of which relief was shown in manuscript. Shading had also been added to one half of the Mt. Rainier sheet, strikingly bringing out the plasticity of this half of the mountain as compared with the unshaded, contoured half. Other maps exhibited were the general relief map of the United States (in manuscript) to appear in the agricultural atlas in preparation by the Department of Agriculture, and sets of the boundary maps, 1:62,500, embodying the recent surveys of the 141st meridian (Alaska-Canada) and the 49th parallel from the Rocky Mountains to Puget Sound.

On two occasions the members were guests of the National Geographic Society at luncheon. At one of these, in the Society's building, there was a remarkable and highly appreciated exhibit of geographical photographs from the Peruvian collections obtained by Prof. Hiram Bingham.